

REMARKS

Claims 1-12 are all the claims pending in the application. Claim 8 has been amended to depend singly from claim 1. In addition, the specification has been amended to correct a typographical error.

Entry of the above amendments is respectfully requested.

I. Response to Objection to the Specification and Claims 8-10

The Examiner objects to the Example which discloses the composition as comprising 0.78% C, which is outside the disclosed range.

The specification has been amended to correct "0.78%" to "0.078%" in the Table on page 6.

In addition, the Examiner objects to claims 8-10 as not further limiting claim 2 (i.e., claim 8 recites a range for manganese outside the range recited in claim 2). Claim 8 has been amended to depend from claim 1 since it further limits claim 1.

In view of the above, withdrawal of the objections is respectfully requested.

II. Response to Rejection of Claims 1-12 under 35 U.S.C. § 103(a)

Claims 1-12 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over JP 11-199984 ("Yamaguchi") in view of Tamehiro (US 6,264,760).

Applicants respectfully traverse the rejection.

Claim 1 is directed to an ultrahigh-strength hot-rolled steel, wherein its chemical composition comprises, by weight:

$$\begin{aligned}0.05\% &\leq C \leq 0.1\% \\0.7\% &\leq Mn \leq 1.1\% \\0.5\% &\leq Cr \leq 1.0\% \\0.05\% &\leq Si \leq 0.3\% \\0.05\% &\leq Ti \leq 0.1\% \\Al &\leq 0.07 \\S &\leq 0.03\% \\P &\leq 0.05\%\end{aligned}$$

the balance being iron and impurities resulting from the smelting, said steel having a bainite-martensite structure that may contain up to 5% ferrite.

Yamaguchi describes steel for automotive applications. *See* [0002]. It is believed that such steels do not require particular characteristics connected to very low temperatures, as they should be used around ambient temperatures and not at -40°C. In addition, regarding high tensile strength, Yamaguchi's structure is martensitic, which means that the tensile strength of Yamaguchi is very high. Particularly, compared to a steel having the same composition with a bainite/martensite mixed structure, the martensitic structure has a higher tensile strength. Accordingly, attempting to modify the steel of Yamaguchi with a structure similar to that of Tamehiro's would lead to a steel with a lower tensile strength. Moreover, in [0015], Yamaguchi discloses that the particular components in specific ranges is needed "in order to obtain a martensitic structure". Thus, Yamaguchi teaches away from a martensitic structure.

Tamehiro, as previously discussed in the previous response, contains a large amount of manganese (more than 1.7%) which would be detrimental to the ductility of the steel. In addition, the steel of Tamehiro does not contain enough titanium (less than 0.03%), niobium, nickel and molybdenum. In addition, the microstructure of Tamehiro's steel is very specific and only obtained through a very special hot rolling process, tailored made for its composition. Furthermore, the strengthening of the compositions occurs through refining of the grain sizes of the microstructure but also through precipitation of carbides or carbonitrides of vanadium,

niobium and molybdenum. These precipitates aim at improving the mechanical characteristics of the heat affected zone after welding (HAZ).

Accordingly, it is submitted that one of ordinary skill in the art would not be motivated to change the structure of Yamaguchi to a bainite/martensite structure or to apply the specific process of Tamehiro to Yamaguchi.

Furthermore, the martensite contained in Tamehiro's steel plates is an auto-tempered, fine grained lath martensite. *See* col. 4, lines 29-35. Fine grained lath martensite is a very specific type of martensite, more easy to form than the regular one. Moreover, it is tempered which reduces its hardness and improves its ductility. In contrast, the steel of claim 1 is a non-tempered martensite obtained through coiling at low temperature in order not to reduce its strength.

Moreover, it is submitted that Tamehiro's plates are not coiled but only formed into line pipes by slow deformation. *See* col. 14, lines 15-21. Thus, contrary to the Examiner's statement of page 6, last paragraph, there is no mention of a coiling on at columns 21-22 nor anywhere else in Tamehiro. In fact, the temperature range given by the Examiner corresponds to a cooling range and not a coiling one.

For at least the above reasons, it is respectfully submitted that claim 1 is patentable over the cited art.

In addition, claims 2-12 depend from claim 1, and thus it is respectfully submitted that these claims are patentable for at least the same reasons as claim 1.

Accordingly, withdrawal of the rejection is respectfully requested.

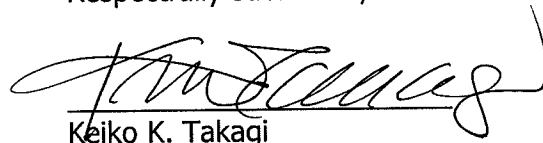
III. Conclusion

In view of the above, reconsideration and allowance of claims 1-12 is respectfully requested.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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23373

CUSTOMER NUMBER

Date: July 6, 2009 (timely filed, July 5, 2009 being a Sunday)